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Ganglion cyst of the temporomandibular joint with intracranial extension in a patient presenting with seventh cranial nerve palsy

Case report

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Ganglion cysts arising from the temporomandibular joint are rare entities that often present with swelling and minimal to no pain in the preauricular region. To the authors' knowledge, a temporomandibular joint ganglion cyst occurring with acute facial nerve palsy and intracranial extension has never been reported. The patient in the current case initially underwent treatment for Bell palsy and then draining of the cyst at an outside hospital with no relief of symptoms. Repeat MR imaging showed an increase in the size of the cystic, enhancing, middle fossa lesion measuring 4 cm. Resection of the lesion was undertaken using a middle fossa approach. After a satisfactory surgical decompression, the patient demonstrated a significant recovery in her facial palsy over a 3-month period of time. This case presents new clinical and radiographic findings associated with these lesions. *(DOI: 10.3171/2011.10.JNS111247)*

Key Words • **temporomandibular joint** • **ganglion cyst** • **synovial cyst** • **intracranial extension** • **oncology** • **skull base surgery**

Ganglion cysts arising from the TMJ are quite rare. They arise from myxoid degeneration of the collagenous tissue of the capsule of the joint but lack joint cavity connection. The contents of the cyst are gelatinous material, and the cyst lining is composed of fibrous connective tissue.[2,3] Ganglion cysts arising from the TMJ are more common in middle-aged women than in men or women of other ages, and patients with these lesions usually present with swelling and minimal to no pain in the preauricular area.[1,4,6,8] We report the case of a patient with a large ganglion cyst of the TMJ with unilateral intracranial extension in whom facial nerve palsy was the initial presenting symptom. We believe this is the first such case reported in the literature.

Case Report

Presentation and Examination. This 63-year-old woman was referred for evaluation of a left middle fossa cystic lesion. The patient initially presented to an outside hospital after an acute onset of facial palsy occurring over a single day. She was initially treated for Bell palsy with a course of antiviral therapy and steroid medication but had no improvement in her facial palsy. An MR imaging study revealed a cystic lesion in the middle fossa that appeared to involve the TMJ, and the patient underwent a subtemporal approach for drainage of the cyst at the outside hospital. After surgery, she had no improvement in her symptoms, and the histological findings were nondiagnostic. Approximately 1 month after the cyst drainage, repeat MR imaging demonstrated partial recurrence of the cyst, and the patient was referred to our institution.

At presentation to our neurosurgery clinic approximately 2.5 months after the patient's first surgery, a repeat MR imaging study showed further increase in the size of the cystic, enhancing, middle fossa lesion, which now measured 4 cm (Fig. 1). Abnormal enhancement of the intratemporal geniculate ganglion and adjacent facial nerve was also evident. Bone CT images of the area showed erosive changes of the mandibular condyle, connection of the TMJ to the middle cranial fossa mass, and dehiscence of the anterior margin of the geniculate ganglion. Initial differential diagnoses, in decreasing order of likelihood, included a nonneoplastic inflammatory process spreading from the TMJ, seventh cranial nerve schwannoma, and atypical meningioma. Resection of the lesion via a middle fossa approach was recommended and accepted by the patient.

This article contains some figures that are displayed in color online but in black and white in the print edition.

Abbreviation used in this paper: TMJ = temporomandibular joint.

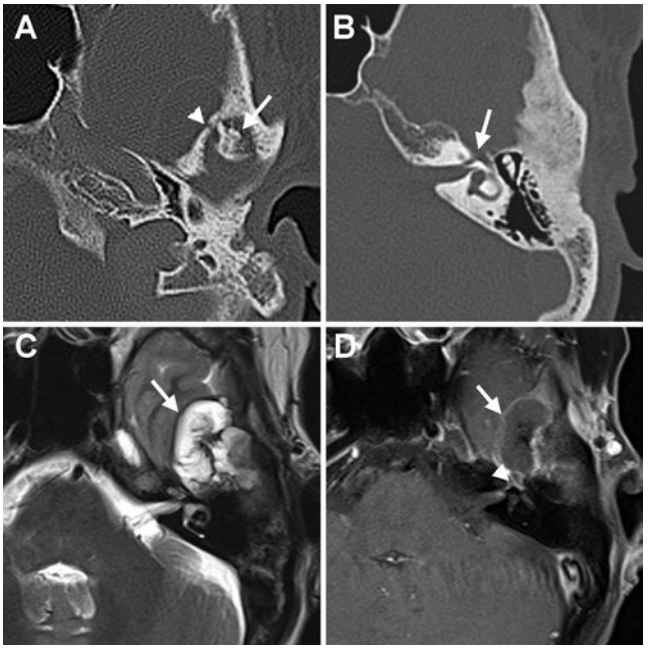

Fig. 1. Preoperative images showing the TMJ lesion involving the condylar fossa bony wall, floor of the middle cranial fossa, and the geniculate ganglion of the facial nerve on the left. An axial bone CT image **(A)** shows the eroded mandibular condylar head *(arrow)* with a lucent defect in the medial wall of the bony condylar fossa *(arrowhead)*. A more superior axial bone CT image **(B)** at the level of the geniculate fossa reveals dehiscence of the anterior bony margin *(arrow)* exposing the geniculate ganglion to the middle cranial fossa. An axial T2-weighted MR image **(C)** through the left middle cranial fossa demonstrates a mixed high- and low-signal lesion in the posterior floor of the middle cranial fossa *(arrow)* abutting the anterior temporal bone margin. With enhancement and fat saturation, an axial T1-weighted MR image **(D)** of the same region as in panel **C** shows the rim-enhancing low-signal lesion *(arrow)* in the floor of the middle cranial fossa with pathological enhancement of the geniculate ganglion *(arrowhead)* and adjacent components of the facial nerve.

Surgery. A left middle fossa craniotomy was done intra- and extradurally in conjunction with the otolaryngology team. The lesion was found to have transdural extension. Exploration involved the capsule of the TMJ, with partial joint and condylar resection, as well as the middle cranial fossa osteotomy to expose the facial nerve. After the intracranial component of the lesion was removed, extensive drilling decompressed the facial nerve in the internal auditory and fallopian canals. An irregular dark tissue was found overlying the facial nerve, which appeared somewhat grayish, but there was no involvement of the nerve with the dark tissue or evidence of discontinuity. The nerve was cleared of this tissue in both directions until a clean segment was reached. The roof of the middle ear was opened and the ossicles were exposed, but no lesional involvement was noted in this area either.

Postoperative Course. No improvement in the patient's facial palsy was seen immediately after surgery. Postoperative imaging was performed (Fig. 2), and she was discharged on postoperative Day 3. Similarly, at the 1-month follow-up, the facial palsy remained; however, a dramatic improvement was observed at the 7-month follow-up examination. Her facial nerve functioning had recovered at that time from House-Brackmann Grade VI to Grade III.[5]

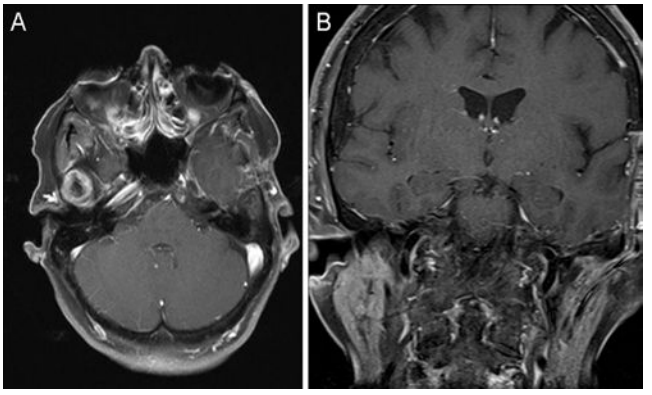

Fig. 2. Axial **(A)** and coronal **(B)** T1-weighted MR images obtained after complete removal of the lesion. No enhancing residual lesion is evident in the left middle fossa. Fat graft is visible on the lateral floor of the left middle fossa.

Pathological Analysis. Histological evaluation showed a collagenous wall with absence of the synovial cell layer on the luminal surface, supporting the diagnosis of ganglion cyst of the TMJ. The collagenous wall of the ganglion cyst showed low cellular density, and there was a small amount of hemorrhage within the collagenous tissue. Inflammatory infiltrates and foreign body granulomas seen in the specimen were likely related to the patient's previous surgery (Fig. 3).

Discussion

Cysts arising from the TMJ may be histologically identified based on the cell type in the cyst wall.[7,8] Cysts lined by synovial cells should be considered a separate entity from cysts lined by fibrous connective tissue (ganglion cysts), even though distinction between the two has been blurred in previous reports. Both forms of cysts can arise from trauma: synovial cysts are thought to arise primarily from an inflammatory response, whereas ganglion cysts arise from myxoid degeneration of the connective tissue of the joint capsule.[6] Despite the different causes and histological descriptions, the clinical characteristics and treatment of these two types are often the same.[7,8]

The clinical presentation of patients with synovial cysts of the TMJ is generally nonspecific. Patients may report pain with jaw movement and localized tenderness to touch or may only describe a preauricular lump without associated pain.[7] No previous cases of intracranial extension or seventh cranial nerve palsy have been reported in the literature. Ali et al.[2] reported the case of a patient with a TMJ ganglion cyst who presented with auricle paresthesia that was thought to have arisen from compression of the auriculotemporal nerve. Albright et al.[1] previously described a patient with a synovial cyst arising from the TMJ who had erosion of the temporal bone into the external auditory canal. Otherwise, symptoms from cysts arising from the TMJ have been relatively confined to the location of origin, with local symptoms such as pain,

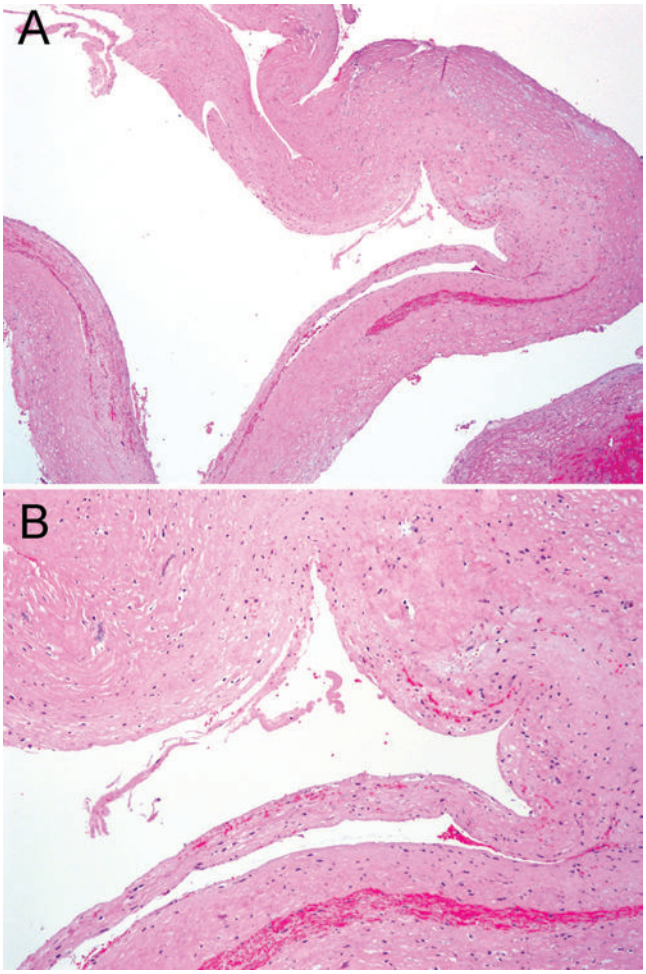

Fig. 3. Photomicrographs of surgical specimens prepared with H & E staining. The collagenous wall of the ganglion cyst has low cellular density **(A)**, and a small amount of hemorrhage is evident within the collagenous tissue. There is absence of a synovial cell layer on the luminal surface of the ganglion cyst **(B)**. Original magnification × 40 (A) and × 100 (B).

clicking with jaw opening, or limited range of jaw motion.[2,6–8] Cases of ganglion or synovial cysts of the TMJ presented in the literature remain scarce, with as few as 24 cases of either type of cyst documented from 1977 to 2005.[2]

This case establishes facial nerve palsy and intracranial extension as a possible complication of ganglion cysts arising from the TMJ. Intracranial or extracranial factors may be responsible for this clinical presentation because of mass effect of the lesion on the geniculate ganglion, the intratemporal segment, or the extratemporal segment of the nerve at the stylomastoid foramen. After a satisfactory surgical decompression, our patient demonstrated a significant recovery in her facial palsy over a 6-month period.

This case further supports the recommendation that aspiration of TMJ ganglion cysts is an inadequate treatment and complete resection should be sought.[1] As in our patient's case, recurrence may follow incomplete resection or aspiration.[1,7] Patients with asymptomatic lesions may undergo a period of conservative management, as spontaneous involution is thought to occur in some cases.[7] Ganglion cysts of the TMJ should now also be considered in the differential diagnosis for patients who harbor middle fossa lesions adjacent to the TMJ even when presenting with facial nerve paralysis.

Disclosure

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Author contributions to the study and manuscript preparation include the following. Conception and design: Couldwell. Acquisition of data: Mumert. Analysis and interpretation of data: Mumert, Altay, Harnsberger. Drafting the article: Mumert. Critically revising the article: Couldwell, Altay, Shelton, Harnsberger. Reviewed submitted version of manuscript: Couldwell, Altay, Shelton, Harnsberger.

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